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EXAMINER

JAMAL, ALEXANDER

ART UNIT PAPER NUMBER

2643

DATE MAILED: 04/15/2004

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Sx

**Office Action Summary**

Application No.

09/703,264

Applicant(s)

THI ET AL.

Examiner

Alexander Jamal

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on February 14, 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Argument and/or Amendment*

1. Applicant's arguments with respect to **claims 1-10,12-39** have been considered but are moot in view of the new ground(s) of rejection.
2. Applicant's arguments with respect to **claim 11** filed February 5<sup>th</sup>, 2004 have been fully considered but they are not persuasive. On applicant's amendment page 10, applicant states that claim 11 includes (among other limitations), "adapted to cancel an echo in a near end signal, the echo comprising at least a portion of a far end telephony signal and at least a portion of a secondary audio signal". Claim 11 does not state the aforementioned limitation. Therefore, the applicant's argument is not persuasive. A more clearly detailed rejection of claim 11 has been provided.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claim 11** rejected under 35 U.S.C. 102(b) as being anticipated by Eppler Jr. et al (5600714).

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As per **claim 11**, Eppler discloses an echo canceller comprising an adaptive filter and coefficients adapted to cancel an echo in a near end (from microphone 12 in Fig. 1) signal (ABSTRACT). The echo comprises the acoustic echo of the signal coupled from speaker 58 to microphone 12. The echo canceller 24 will also be adapted to cancel an electrical echo that propagates from D/A converter 32 to A-D converter 42 via the far end telephone system 24. Since the line hybrid echo canceller 46 will not completely remove the electrical echo, any remaining electrical echo will travel through the system and again be transferred from loudspeaker 38 to microphone 12. As such the echo received at microphone 12 will comprise both acoustic and electrical echo.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-3,6,8-10,22,23,33,36,37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler Jr. et al (5600714), and further in view of Finn (5706344).

As per **claim 1**, Eppler discloses an echo canceller (in a communications system) comprising an adaptive filter and coefficients adapted to cancel an echo in a near end signal

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(from microphone 12 in Fig. 1). The echo comprises part of a far end signal (signal from telephone system 34 in Fig. 1) (ABSTRACT). However, Eppler does not disclose that the echo comprises a portion of a secondary audio signal.

Finn teaches that in echo canceller systems, a far end signal (voice) and a secondary audio signal may be combined and output to the near end speaker and also output to an adaptive echo canceller in order to reduce the echo that both the voice and secondary audio signal produce in the near end microphone. It would have been obvious to one of ordinary skill in the art at the time of this application that a secondary audio signal could be summed with the far end voice signal and the combination sent to the echo canceller (as well as the near end loudspeaker) in order to help remove the echo created in the near end microphone by both signals.

As per **claim 22**, claim 22 is rejected for the same reasons as claim 1 and the additional disclosure from Eppler that his data transmission system comprises a far end telephony device 34 (Fig. 1, Col 6 lines 18-25). The near end telephony device is the speaker telephone in Fig. 1 (excluding far end telephone 34).

As per **claim 33**, claim 33 is rejected for the same reasons as claim 1 and the additional teachings from Finn that the primary and secondary signals are combined into a reference signal that is adaptively filtered, and then subtracted from the near end signal (Col 1 lines 23-44).

As per **claim 37**, claim 37 is rejected for the same reasons as claims 1 and 33. The combining, filtering and subtracting means are inherent to the system for the purpose of

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combining, filtering, and subtracting the primary and secondary signals as specified in the rejections of claims 1 and 33.

As per **claim 2**, Eppler discloses that the filter is a finite impulse response filter (Col 6 lines 25-36) (Col 7 lines 17-25).

As per **claim 3**, Eppler's FIR filter is implemented as a linear transversal filter as seen in Fig. 2 (Col 6 lines 38-51) (Col 7 lines 17-25).

As per **claim 6**, the system of Eppler and Finn inherently comprises a buffer coupled to (FINN: Fig. 1) the adaptive filter 24 via the receive path and amplifier 76 for the purpose of combining the primary and secondary signals as taught by Finn.

As per **claim 8**, In Eppler's echo canceller (Fig. 1) in view of Finn's teachings, the adaptive filter generates an echo estimate of the combined primary and secondary signals. The cancellation of the echo in the near end signal is a function of the estimated echo (Col 6 lines 37-51) (Col 7 lines 17-25).

As per **claim 9**, Eppler's echo canceller further comprises difference operator 20 (Fig. 1) to subtract the echo estimate from the near end (input waveform at terminal 38 in Fig. 1) signal (Col 6 lines 37-51) (Col 7 lines 17-25).

As per **claim 10**, In Eppler's echo canceller the output of difference operator 44 (Fig. 1) is fed-back to the echo canceller as an error signal for filter adaptation (Col 4 lines 20-39) (Col 6 line 65 to Col 7 line 16).

As per **claim 23**, In Eppler's data transmission system, the second telephony device comprises speaker 58 (EPPLER: Fig. 1) that would broadcast the secondary audio source taught by Finn. A portion of that signal is received by microphone 12 as acoustic echo.

As per **claim 36**, In Eppler's method the adaptive filtering of the reference signal (the combination of two signals as taught by Finn) comprises generating an estimate of the echo as a function of the transfer function of the electrical (EPPLER: terminals 36, 38 Fig. 1) and acoustical (EPPLER: microphone 12 and speaker 58) echo paths (Col 6 lines 18-37) with echo cancellers 24,46. Additionally, any electrical echo that is not cancelled by canceller 46 will propagate through to canceller 24. As such, the echo estimate generated by canceller 24 will be a function of the electrical echo, with the electrical echo being a function of the electrical echo path.

5. **Claim 12** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler Jr. et al (5600714) as applied to claim 11 above, and further in view of Finn (5706344).

As per **claim 12**, Eppler discloses applicant's claim 11. However, Eppler does not disclose that the echo received by the near end microphone comprises a portion of a secondary audio signal.

Finn teaches that in echo canceller systems, a far end signal (voice) and a secondary audio signal may be combined and output to the near end speaker and also output to an adaptive echo canceller in order to reduce the echo that both the voice and secondary audio signal produce in the near end microphone. It would have been obvious to one of ordinary skill in the art at the time of this application that a secondary audio signal could be summed with the far end voice

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signal and the combination sent to the echo canceller (as well as the near end loudspeaker) in order to help remove the echo created in the near end microphone by both signals.

6. **Claims 4,21,32,35,39** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claims 1,11,22,33,37 above, and further in view of Sih (5732134).

As per **claims 4,21,32,35,39**, Eppler and Finn disclose applicant's echo canceller as per claims 1,11,22,33,37. However, they do not teach the echo canceller comprising double talk logic to control the filter adaptation based upon speech in the near end signal.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) and cease coefficient adaptation in order to prevent the corruption of the echo path estimate.

7. **Claim 5** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claim 1 above, and further in view of Sellenslagh et al. (3433898).

As per **claim 5**, Eppler and Finn disclose applicant's echo canceller as per claim 1. However, they do not teach the secondary tone comprising a pulse metering tone.



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Sellenslagh teaches that in certain telephony systems, it is desirable to generate pulse metering tones to increment call cost meters (Col 1 lines 29-47). It would have been obvious to one of ordinary skill in the art at the time of this application to include pulse metering as part of the terminal (and part of the secondary signal) for the purpose of controlling toll collection for services rendered to the user of the terminal.

8. **Claims 7,34,38** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claims 1,6,33,37 above, and further in view of Hasegawa (5905717).

As per **claims 7, 34,38**, Eppler and Finn disclose applicant's echo canceller as per claims 1,6,33,37. However, they do not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator to down sample the primary signal, and also for the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the filter.

9. **Claims 13-15,24,25** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claims 11,12,22,23 above, and further in view of Isenburg et al. (5570295).

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As per **claims 13,24** Eppler and Finn disclose applicant's echo canceller as per claims 11,12,22,23. However, they do not teach the secondary audio signal being generated by a set-top-box.

Isenburg teaches a set-top-box (with a telephone interface) with a standard telephone interface will make it easier for a user to access the dial-in services advertised on the system (Col 4 lines 15-31). It would have been obvious to one of ordinary skill in the art at the time of this application to integrate the echo canceller with a set-top-box (with the two audio signals being the telephone signals and the cable signals) for the purpose of allowing easier access to advertised services.

As per **claim 14,25**, In Eppler's echo canceller, the electrical echo comprises a portion of the far end (telephone system 34 in Fig. 1) signal. The signal is acoustically coupled from speaker 56 (Fig. 1) to microphone 12. The portion of that echo that is not cancelled is sent towards telephone system 34, and from that a portion of that signal is reflected back towards speaker 58 as an electrical echo that has a portion of the far end signal in it. Although line hybrid echo canceller 46 will reduce a substantial amount of the electrical echo, any remaining echo will be passed along to echo canceller 24.

As per **claim 15**, the system of Eppler and Finn inherently comprises a buffer coupled to (FINN: Fig. 1) the adaptive filter 24 via the receive path and amplifier 76 for the purpose of combining the primary and secondary signals as taught by Finn.

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10. **Claims 16-20, 26-31** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714), Finn (5706344), and Isenburg et al. (5570295) as applied to claims 11-15,22-25 above, and further in view of Hasegawa (5905717).

As per **claims 16,26**, Eppler, Finn and Isenburg disclose applicant's echo canceller as per claims 11-15,22-25. However, they do not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator to down-sample the primary signal, and also for the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the filter.

As per **claim 17,28** In Eppler's echo canceller (Fig. 1) in view of Finn's teachings, the adaptive filter generates an echo estimate of the combined primary and secondary signals. The cancellation of the echo in the near end signal is a function of the estimated echo (Col 6 lines 37-51) (Col 7 lines 17-25).

As per **claim 18,29**, Eppler discloses that the filter is a finite impulse response filter (Col 6 lines 25-36) (Col 7 lines 17-25).

As per **claim 19,30**, Eppler's FIR filter is implemented as a linear transversal filter as seen in Fig. 2 (Col 6 lines 38-51) (Col 7 lines 17-25).

As per **claim 20,31** Eppler's echo canceller further comprises difference operator 20 (Fig. 1) to subtract the echo estimate from the near end (input waveform at terminal 38 in Fig. 1) signal (Col 6 lines 37-51) (Col 7 lines 17-25).

As per **claim 27**, the system of Eppler and Finn inherently comprises a buffer coupled to (FINN: Fig. 1) the adaptive filter 24 via the receive path and amplifier 76 for the purpose of combining the primary and secondary signals as taught by Finn.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 703-305-3433. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 703-305-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

AJ  
April 7, 2004

  
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